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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

MAY 11, 1935

Strange Sport of Modern Youth

See Page 303

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW?

An English researcher has found 642 references to weather in the writings of Shakespeare.

It is estimated that Europe in 1800 had 180 million people; whereas in 1930 the population was 640 million.

The tuberculosis death rate among Indians is seven times as high as among other inhabitants of the United States.

A total of 301 species and subspecies of birds have been found within a radius of about twenty miles of Washington, D. C.

The Cleveland, Ohio, Academy of Medicine has the custom of exhibiting each year the art work and hobby products of physicians in the city.

How pre-school children of France and the United States compare in mental development will be tested, using tests designed at the University of California.

When Canada geese migrate, the more powerful birds take turns leading the flight.

The native home of the lilac is the Balkans, and wild lilacs still grow there in profusion.

Fields in the Texas Panhandle have lost as much as two and three feet of soil and subsoil during recent dust storms.

China's daily newspaper, the Peking Gazette, was issued regularly from 713 A. D. until the Manchu dynasty fell in 1911.

New Hampshire, which hopes to escape destructiveness of the Dutch elm disease, values its 100,000 elms at about $3,000,000.

North Dakota reports 2,000,000 fewer acres infested with grasshopper eggs this season than in 1934, and the state has hope of soon conquering the pests.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the articles.

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POPULATION

How many old people will live in the United States in 1980? p. 309.

PSYCHOLOGY

What effect has sound upon the emotions? p. 304.

SURGERY

What physical defect is mistakenly known as "upside-down Stomach"? p. 304.

AERONAUTICS

New Anti-Aircraft "Ears" Hear "Enemy" 12 Miles Away

Five Years of Research Improves Airplane Sound Locators Which Now Automatically Light the Planes

NEW "ears" for U. S. anti-aircraft guns that hear enemy airplanes a dozen miles away, automatically flood them with searchlights so that gunners can fire with daytime effectiveness in the stormiest, blackest night have been developed as the result of five years of research.

Cautiously buried in a technical paper delivered before the American Acoustical Society by Frank R. House, of the Sperry Gyroscope Co., were brief details of the new robot airplane sound locators. They can detect high-flying aircraft above clouds or in the black of night. Synchronized with the sound detectors are giant searchlights which quickly follow the hidden airplane throughout the sky. They make possible an accuracy of anti-aircraft gunfire at night comparable with that attained in the daytime.

Secret of their success is the system of soundproofing which sifts out extraneous background noises and allows the sought-for drone of the airplane propeller and motor to enter the apparatus. Once inside, it is amplified to audible intensity.

The new development makes possible the operation of the "ears" in howling winds and driving rain and yields a performance equal to that obtained with the older detectors under the quietest conditions.

Ordinary aircraft locators can detect an approaching airplane twelve miles away when the surrounding noise is of the intensity found in the open country. At the noise level of the suburbs the range is cut to six miles. With a background noise like that of a residential district the limit is three miles; while with city noises in the vicinity the range is only one mile.

Limit Approaches Ideal

By decreasing the intensity of these background sounds in the detector's amplifier system, the detection limit of the new aircraft "ears" approaches the ideal open country conditions.

With unsoundproofed airplane detectors a passing truck 1,000 feet from the "ear" will cut its range for open country from twelve to three miles. Conversation within ten feet will cut the range to two miles, while a barking dog at twenty feet decreases the detection limit to one mile. Wind and rain may have even greater effects.

How the surrounding sounds are decreased in the apparatus and the airplane noises allowed to pass is still a secret, Mr. House said.

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BOTANY

Chemicals Cause Changes In Rate of Plant Growth

CHEMICALS out of a bottle proved quite as effective in causing growth-rate changes in plants, as did the special growth-stimulating substances secreted by the plants themselves, in experiments carried on by Dr. A. E. Hitchcock at the Boyce Thompson Institute for Plant Research.

The plant substances whose action was thus chemically duplicated are known as auxins; they are more or less analogous to the hormones or ductless gland secretions of animals. Auxins stimulate growth in plants, cause roots to start where no roots grew before, etc. Applied to one side of a stem or growing leaf and not to the other, they will induce faster growth on one side and thus cause the plant to bend.

All these physiological responses Dr. Hitchcock obtained with three rather widely different organic acids. The first is a commercially available compound known as indole-3-n-propionic acid; it is chemically similar to the plant compound known as hetero-auxin. The other two acids, phenylacrylic and phenylpropionic, are chemically quite different.

But all three of them, applied to the stems and leaves of buckwheat, tobacco, tomato and other plants, produced typical auxin effects. Bending occurred toward the treated side of the plant if the amount used was large, away from it if the amount was small. Bending usually took place within an hour after the chemical was applied. Its degree depended on the age and activity of the plant part treated and upon the material in which the chemical was dissolved.

This response, together with the swelling and root initiation which these "activators" produced is similar to the behavior of plants exposed to carbon monoxide, ethylene acetylene and propylene gases in earlier experiments by Dr. Hitchcock and in others by Dr. William Crocker and Dr. P. W. Zimmerman of the Boyce Thompson Institute.

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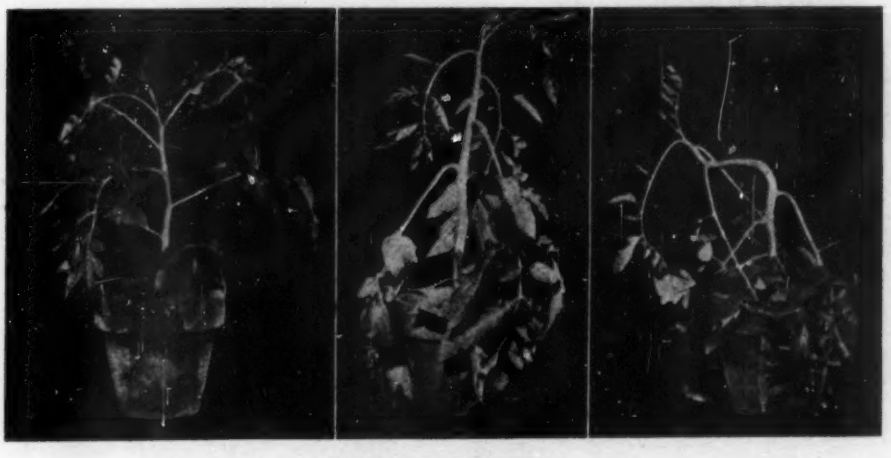
Iran and Iraq are the official names respectively for Persia and Mesopotamia.

Iceland's capital, Reykjavik, has a thoroughly modern hospital of 100 beds.



LOPSIDED GROWTH

Chemical duplications of plant auxins have curious effects on the growth of plants within an hour after application. On the left is a normal tomato plant, untreated; in the center one treated with ethylene, and on the right one treated with indole propionic acid. Bending is toward the treated side when the application is large; away from it if small.

PHYSICS

Einstein Attacks Quantum Mechanics

Calls One of Science's Most Important Theories "Incomplete" and Anticipates More Satisfactory One

PROFESSOR Albert Einstein will attack science's important theory of quantum mechanics, a theory of which he was a sort of grandfather. He concludes that while "correct" it is not "complete."

With two colleagues at the Institute for Advanced Study at Princeton, N. J., the great relativist is about to report to the American Physical Society what is wrong with the theory of quantum mechanics, it has been learned exclusively by Science Service.

Quantum theory, with which science predicts with some success inter-atomic happenings, does not meet the requirements for a satisfactory physical theory, Prof. Einstein is to report in a joint paper with Dr. Boris Podolsky and Dr. N. Rosen.

In quantum theory as now used, the latest Einstein paper will point out that where two physical quantities such as the position of a particle and its velocity interact a knowledge of one quantity precludes knowledge about the other. This is the famous principle of uncertainty put forward by Prof. Werner Heisenberg and incorporated in quantum theory. This very fact, Prof. Einstein feels, makes quantum theory fail in the requirements necessary for a satisfactory physical theory.

The Requirements

These two requirements are:

1. The theory should make possible a calculation of the facts of nature and predict results which can be accurately checked by experiment; the theory should be, in other words, *correct*.

2. Moreover a satisfactory theory should, as a good image of the objective world, contain a counterpart for things found in the objective world; that is, it must be a *complete* theory.

Quantum theory, Prof. Einstein and his colleague will report, fulfills the correctness requirement but fails in the completeness requirement.

While proving that present quantum theory does not give a complete description of physical reality, Prof. Einstein believes some later, still undeveloped theory will make this possible.

He concludes: "While we have thus shown that the wave function (of quantum theory) does not provide a complete description of the physical reality, we left open the question of whether or not such a description exists. We believe, however, that such a theory is possible."

The development of quantum mechanics has proved very useful in exploring the atom. Six Nobel Prizes in physics, including one to Einstein, have been awarded for various phases of the researches leading up to quantum mechanics. The names of Planck, Bohr, de Broglie, Heisenberg, Dirac and Shroedinger, as well as Einstein, are linked with quantum mechanics.

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PHYSICS

Physicists' New View of Physical World Explained

By Dr. Boris Podolsky, Prof. Einstein's Associate at Institute for Advanced Study, Princeton, N. J.

PHYSICISTS believe that there exist real material things independent of our minds and our theories. We construct theories and invent words (such as electron, positron, etc.) in an attempt to explain to ourselves what we know about our external world and to help us obtain further knowledge of it. Before a theory can be considered to be satisfactory it must pass two very severe tests. First, the theory must enable us to calculate facts of nature, and these calculations must agree very accurately with observations and experiments. Second, we expect a satisfactory theory, as a good image of objective reality, to contain a counterpart for every element of physical world. A theory satisfying the first requirement may be called a *correct* theory, while, if it satisfies the second requirement, it may be called a *complete* theory.

Hundreds of thousands of experiments and measurements have shown that, at least in cases when matter moves much slower than light, the theory of Planck, Einstein, Bohr, Heisenberg, and Schroedinger known as Quantum Mechanics is a correct theory. Einstein, Podolsky, and Rosen now discuss the question of the completeness of Quantum Mechanics. They arrive at the conclusion that Quantum Mechanics, in its present form, is *not* complete.

In Quantum Mechanics the condition of any physical system, such as an electron, an atom, etc., is supposed to be completely described by a formula known as a "wave function." Suppose that we know the wave function for each of two physical systems, and that these two systems come together, interact, and again separate (as when two particles collide and move apart). Quantum Mechanics, although giving us considerable information about such a process, does not enable us to calculate the wave function of each physical system after the separation. This fact is made use of in showing that the wave function does not give a complete description of physical reality. Since, however, description of physical systems by wave functions is an essential step of Quantum Mechanics, this means that Quantum Mechanics is not a complete theory.

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PHYSICS

Exact Wording Of The Original Abstract

THE abstract of the Einstein-Podolsky-Rosen paper follows:

Title: Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?

Authors: A. Einstein, B. Podolsky and N. Rosen, Institute for Advanced Study, Princeton, N. J.

Abstract:

In a complete theory there is an element corresponding to each element of reality. A sufficient condition for the reality of a physical quantity is the possibility of predicting it with certainty, without disturbing the system. In quantum mechanics in the case of two physical quantities described by non-commuting operators, the knowledge of one precludes the knowledge of the other. Then either (1) the description of reality given by the wave function in quantum mechanics is not complete or (2) these two quantities cannot have simultaneous reality. Consideration of the problem of

making predictions concerning a system on the basis of measurements made on another system that had previously interacted with it leads to the result that if (1) is false then (2) is also false. One is thus led to conclude that the description of reality as given by a wave function is not complete.

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Among the curious accidents that happen are a number of instances of small live fishes becoming impacted in throats of men.

"The buffalo was the great forerunner of the automobile; he made the best pioneer roads and the widest," says a writer in *Outdoor Indiana*.

PHYSICS

Earth's Lop-Sided Magnetism Provides Check of Cosmic Rays

THE lop-sided magnetism of the earth is now being used to study the nature of cosmic radiation, it was indicated in the address of the world-famous Belgian scientist Abbé Lemaître before the meeting of the American Physical Society.

Father Lemaître read the paper of Prof. M. S. Vallarta of Massachusetts Institute of Technology on the "Longitude Effect of Cosmic Radiation." Prof. Vallarta with Father Lemaître developed the theory of cosmic rays so well supported by scientific evidence which assumes that all the incoming rays are of a particle nature and are charged with electricity.

The earth's magnetic field, Father Lemaître explained, is not perfectly symmetrical, but acts as if its center were about 186 miles from the ideal center of the earth. The resultant field on the outside, therefore, is a bit off-center too.

Calculations on what the magnetic lop-sided effect should be on cosmic ray intensity at widely separated points about the earth gives almost perfect agreement with experimental measurements, Father Lemaître said. Data taken in places all around the world from zero longitude at Greenwich, England, to the Antipodes on the opposite side of the earth all fall on the new calculated curves.

There is but one set of observational data which does not fit the new theoretical curves. These data were obtained by Prof. Robert A. Millikan and Dr. Victor Neher on an automatic instrument placed aboard a ship enroute from Honolulu to Sydney-Melbourne. Other data by these scientists fit perfectly well, Abbé Lemaître explained. The new report lends additional support to the idea that cosmic rays are particles.

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$$
\begin{aligned}
1 \quad & \Psi' = A\Psi = a\Psi \\
2 \quad & \Psi = e^{\frac{2\pi i}{h} p_0 x} \\
3 \quad & P = \frac{h}{2\pi i}\frac{\partial}{\partial x} \\
4 \quad & \Psi' = P\Psi = \left(\frac{h}{2\pi i}\right)\frac{\partial \Psi}{\partial x} = p_0\Psi \\
5 \quad & q\Psi = x\Psi = a\Psi \\
6 \quad & P(a,b) = \int_a^b \bar{\Psi}\Psi\, dx = \int_a^b dx = b-a \\
7 \quad & \Psi(x_1, x_2) = \sum_{n=1}^{\infty} \Psi_n(x_2)\, u_n(x_1) \\
8 \quad & \Psi(x_1, x_2) = \sum_{s=1}^{\infty} \phi_s(x_2)\, v_s(x_1) \\
9 \quad & \Psi(x_1, x_2) = \int_{-\infty}^{\infty} e^{\frac{2\pi i}{h}(x_1 - x_2 + x_0)p} dp \\
10 \quad & u_p(x_1) = e^{\frac{2\pi i}{h} p x_1} \\
11 \quad & \Psi(x_1, x_2) = \int_{-\infty}^{\infty} \Psi_p(x_2)\, u_p(x_1)\, dp \\
12 \quad & \Psi_p(x_2) = e^{\frac{-2\pi i}{h}(x_2 - x_0)p} \\
13 \quad & P = \frac{h}{2\pi i}\frac{\partial}{\partial x_2} \\
14 \quad & v_x(x_1) = \delta(x_1 - x) \\
15 \quad & \Psi(x_1, x_2) = \int_{-\infty}^{\infty} \phi_x(x_2)\, v_x(x_1)\, dx \\
16 \quad & \phi_x(x_2) = \int_{-\infty}^{\infty} e^{\frac{2\pi i}{h}(x - x_2 + x_0)p} dp = h\delta(x - x_2 + x_0) \\
17 \quad & Q = x_2 \\
18 \quad & PQ - QP = \frac{h}{2\pi i}
\end{aligned}
$$

EINSTEIN USES THESE COMPLEX EQUATIONS

PHYSICS

Create Forces Equal to 1,200,000 Times Gravity

SPINNING a duralumin rotor in a vacuum, science can create forces equal to 1,200,000 times that produced by the gravitational pull of the earth, it was reported to the American Society by Dr. E. G. Pickels, of the University of Virginia.

Such an enormous force offers the possibility of being able to pull molecules apart. Centrifugal force 1,200,000 times as great as the force of gravity may be explained by saying that gravity makes an object dropped from a high building fall 16 feet in the first second. If the force of gravity were as large as the force in Dr. Pickels' ultracentrifuge, a dropped

object would fall 19,200,000 feet in the first second, or more than 3,600 miles.

Using air pressure of 50 pounds to the square inch to drive the rotor, top speeds of 156,000 revolutions each minute were obtained. At this point the rotor flew apart and the calculated centrifugal force was 1,200,000 times the force of gravity.

"Photographs of molecular sedimentation in an observational centrifuge," Dr. Pickels said, "demonstrate the possibilities of the apparatus in molecular weight determinations."

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PHYSIOLOGY

Tree-Climbing Children Now Approved by the Physician

Exercises That Stretch the Chest Muscles Help To Flatten the Chest and Avoid Tuberculosis

LITTLE Johnnie's tree-climbing tendency received the stamp of medical approval at the meeting of the American College of Physicians. The OK was granted subject to the reservation that Johnnie does not receive injury to life or limb.

As the family offspring flits from bough to bough in emulation of Tarzan, his mother can take heart in knowledge that his chest is changing from its baby-ish barrel shape to the normal flat chest of maturity.

The normal chest, Dr. S. A. Weisman of the University of Minnesota told his medical colleagues, is of the flat type, despite popular opinion to the contrary. And just to console further the frantic mother of a tree-climbing son, Dr. Weisman said that flat-chested persons are less liable to develop tuberculosis. And they are, on the average, taller, heavier and have better mental ability as shown in their scholastic records.

The healthy flat-chest, as described by Dr. Weisman, is narrow from front to back and wide from side to side. The deep chest of tuberculous patients is thick from front to back and narrow from side to side. Not all deep-chested persons will necessarily have tuberculosis, but they have a greater predisposition to it than the flat-chested persons. In normal adult persons the depth of the chest is 67 per cent. of the width. In tuberculous persons the depth is 77 per cent. of the width.

The tuberculous deep chest is like that of an infant, Dr. Weisman said. The new born baby's chest is nearly round, as deep as it is wide, but by the age of five it should normally have flattened out into adult proportions.

Exercises that stretch the chest muscles will help to flatten the chest. Tree-climbing and ladder-climbing are good exercises for this, he said. Dr. Weisman thinks all children entering school should have their chest measurements taken, and if they show the deep-narrow type the children should be given proper exercises to correct the condition. Poor posture, such as drooping or round shoulders, and protruding shoulder blades are the result, not the cause, of the deep-narrow chests. Flat-chested persons may stand with shoulders dropped forward, but they are not likely to.

Women have naturally deeper chests than men, but Dr. Weisman thinks women of the future, as a result of the more active, athletic lives they now lead, will tend to have chests as flat and wide as men normally have now.

The flat chest has a greater vital capacity, that, is it can suck in more air, and consequently more oxygen is supplied to the brain and other tissues of the body. This, Dr. Weisman believes, may account for the better scholastic standing and greater mental ability he found in the average flat-chested individual when compared with the average deep-chested person.

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ANTHROPOLOGY

Human Race May Lose Half Of Upper Front Teeth

WE MAY be on the way to losing half our upper front teeth.

This is indicated by studies by Prof. M. F. Ashley-Montagu, of New York University, reported to the meeting of the American Association of Physical Anthropologists. He finds that along with the tendency of the human face to become narrower goes a decrease in size of the two outer incisors, or "cutting teeth," in the upper jaw. In many cases they disappear altogether. This tendency, however, is not found in apes and monkeys.

Also discussing teeth, Dr. Milo Hellman, Columbia University, told his colleagues that wisdom teeth reach full development in people who are tallest and heaviest.

And, he added, while women mature more rapidly than men in almost every other respect, the males win in the race of wisdom teeth. Men have much less "trouble with their wisdom teeth" than women. The reason appears to be that the male jaw goes on growing after that of women contemporaries stops.

Another speaker, Dr. Adolph H. Schultz, of the Johns Hopkins University, reported that apes are like men in having one arm and one leg longer than the other. The difference between right and left legs is about the same in the two groups, but in man the longer arm (usually the right) exceeds the shorter by a larger length percentage than is the case of his lower evolutionary relatives.

Dr. Schultz made his findings as the result of detailed measurements on arm and leg bones of twelve hundred human and ape skeletons in the collections of the U. S. National Museum and Western Reserve University, Cleveland. This is the largest series of measurements ever made on physical asymmetry, or "lop-sidedness."

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MEDICINE

Many "Problem" Children Now Treated Successfully

MAKING "bad" boys and girls over into acceptable members of society was described by Drs. Earl D. Bond and Lauren H. Smith before the American College of Physicians in Philadelphia. The boys and girls in this group had become behavior problems as a result of head injuries or rather mild inflammations of the brain. The children were so bad that they had become a menace to the community. A busy life in a special institution, interviews in the playroom with the psychiatrist, and a chance to try themselves out as members of a small, selected community, enabled one-third of the children to attain satisfactory behavior and mode of conduct.

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ORNITHOLOGY

Pastime of Kings Revived

Experimental Group of Very Modern High School Boys Are Training Their Own Hawks for Falconry

By DR. FRANK THONE

See Front Cover

FALCONRY, pastime of kings and nobles in the Middle Ages, has been revived in modern America by a little group of Washington, D. C., high school boys. Under the leadership of Frank and John Craighead, twin sons of a scientist in the U. S. Department of Agriculture, these modern falconers capture and train their own hawks, fly them at such game as rabbits and sparrows, and at last willingly turn them loose as free birds, to live their own lives of fierce liberty.

For the Craighead lads and their companions are not primarily hunters, and they are emphatically not trying to commercialize their hobby. Thrill and reward enough for them in the hazardous climbing of cliffs and trees to obtain the young, half-fledged birds, and then in winning the confidence and friendship of these wild, independent-spirited pets.

The hawking adventures of the Craigheads are a curious mixture of the traditional and the modern. They whistle their hawks back to fist, or swing a lure to call them down from the air. They fetter their legs with jesses, which are little handcuffs of soft leather, snapped on to a swiveled leash. They give them wooden blocks of approved ancient pattern for their perches. But when they ride afield they go not on gaily caparisoned horses like the knights of old, but in a small auto. And the swiftness and sureness of their birds is recorded, not in rimes of admiring troubadours, but on 16-millimeter movie film.

Experimenters

Nor are they bound by tradition even in this most traditional of all sports. They are experimenters, and like to find out for themselves. Sometimes they discover that tradition is correct, sometimes they show that it is not.

Tradition has it, for example, that the finest of all hawks is the peregrine falcon, a medium-sized bird all swiftness and dash. This they found out to their own satisfaction to be true, for they have had most success with the American first-cousin of the peregrine, the species known in this country as the duck hawk. They speak with most enthusiasm of various duck hawks they have trained, especially of a favorite bird they still have, called Ulysses.

They have, however, successfully challenged tradition in the matter of the trainability of owls, which are zoologically rather close relatives of hawks. Owls are supposed to be either too stupid or too sleepy to learn anything, but they have succeeded in training several of them; though they admit that owls are better as pets than as hunting companions, since they lack the vigorous hunting instinct of the hawks. Still, the Craighead lads remember some of their owls with real affection, especially a barn owl they called "Windy" because of his early hissing proclivities, and a tiny burrowing owl they caught on the Nebraska prairie and named "Cactus." Poor Cactus met a tragic end. He hid behind a tuft of grass and got stepped on by one of the boys who was hunting grasshoppers to feed his luckless pet.

Tradition loses out, too, in the matter of hooding hawks while carried on the fist until the game is flushed. The Craigheads do have hoods for some of their hawks, properly belled and all that; but they declared that they have not found hoods to be really necessary, and advise against them for other ambitious young practitioners of the ancient art of falconry. Setting yourself up in falconry is basically simple, though not easy.

First, you catch your birds. That is done in exactly the way followed in capturing young birds of any kind: you climb up to the nest and take them out. But the nest of a hawk is almost invariably in the topmost branches of a lofty tree, or on a rocky ledge of some neck-hazardous cliff, so it isn't like kidnaping young bluebirds, by a long way. However, if you are young and enthusiastic, and not hasty and foolhardy, you can do it. The Craigheads get all the hawks they want, and haven't broken any bones yet.

Let Them Grow Up

There is a right time to catch young hawks, too. It is always best, the boys say, to let them stay in the nest as long as possible. The nearer grown up a hawk is when captured, the swifter and keener will the bird be as a hunter. So they let them get well feathered, just short of the age for first flight, as a rule, and then capture them and take them home.

There is a second advantage in letting the young hawks stay in the nest as long as possible. Ma- (*Turn to Page* 306)

FLEDGLING HUNTERS TEST THEIR WINGS

PHYSIOLOGY

Women With Heart Disease Are Likely to be Fat

WOMEN with heart disease average broader and heavier than women who do not have heart trouble, Dr. Antonio Ciocco of the Johns Hopkins University told the American Association of Physical Anthropologists. All their transverse dimensions are relatively greater, particularly the abdominal circumference.

Dr. Ciocco's statement was based on measurements of a series of patients at the Johns Hopkins Hospital. He emphasized that he does not at present see any cause-and-effect relation between fatness and heart disease. He merely found a group of women suffering from heart disease, and selected a group of others to compare with them. The measurements showed a marked correlation, but not necessarily a cause.

He made especially clear the point that the fatness was not due to the heart disease. It came simply from over-eating, so far as he could see, he said.

Dr. Ciocco's results parallel closely a similar set of measurements on men with heart disease, made some time ago under the direction of Dr. Raymond Pearl.

Science News Letter, May 11, 1935

CHEMISTRY

Rich Untapped Discoveries Await Chemists of Future

PREDICTION of untapped and rich progress for chemistry compared with which present achievements are only a faint scratching of the surface was made by Prof. Hugh Scott Taylor, chairman of Princeton University's department of chemistry, before the American Chemical Society.

Prof. Taylor's prediction set the keynote of confident hopefulness for the convention of 10,000 chemists gathered to discuss current progress in their respective fields.

Pioneer work in chemistry comparable to the boom days of gold mining, when any man might pick up nuggets, is past, Dr. Taylor indicated. The future progress will succeed through research which might be likened, by the same gold mining picture, to the intensive and highly specialized technique required for gold mining after the first feverish boom rush is past. It is during this second intensified period that the greatest values are obtained.

The vast body of academic and experimental knowledge obtained by physical chemistry in the last decade, Dr. Taylor said, will yield for the coming generations highly valuable technical applications.

The work of the physical chemist is that of the blazer of new trails which others would subsequently follow, Prof. Taylor said. The experiments and deductions of present-day physical chemists "can already be charted on a contour map from which the easiest path to reaction can be deduced with the facility with which the aviator can choose his airway through a mountain range, with the more familiar geographical charts and maps of the regions which he traverses."

Science News Letter, May 11, 1935

PSYCHOLOGY

Controlled Sound in Drama Sways Emotion of Audience

HOW changing the pitch of sound can produce tenseness and excitement in an audience and bring some members of it to the verge of hysteria was described by Harold Burris-Meyer, of Stevens Institute of Technology, New York City, before the meetings of the Acoustical Society of America.

Speaking on the use of controlled sound in the drama, the Hoboken scientist told how experiments had disclosed that all sounds in the theater could be directed from a single switchboard just as lighting effects are now varied.

The softest whispers can be made audible to all people in the theater without anyone suspecting that he is not hearing the normal tone of the actor. Opera singers, for example, will no longer have to develop the lung capacities of heavyweight prizefighters to sing above the accompaniment of a too-ambitious thirty-piece orchestra. The new system permits a singer to be heard from any part of the stage and without the artificiality which comes when the tenor has to step to the footlights—while the stage action stops—to deliver his aria.

While there is no direct connection between the emotions, and a sound cannot engender love, hate or fear, Mr. Burris-Meyer cautioned, it is possible for sounds to suggest indirectly something which will stimulate these emotions. Thus the audience can share more completely the motivation of the actor. "Soft lights and sweet music" are something more than the name of a song: they indirectly build up a feeling of romance in an audience watching a love scene.

Science News Letter, May 11, 1935

IN SCIE

SURGERY

Surgery Cuts Death Rate For "Upside-Down Stomachs"

TUMORS of the lung and other tumors in the chest, ruptures of the diaphragm which have become popularly but mistakenly known as cases of "upside-down" stomach, and adhesions around the heart which interfere with that organ's function may today be successfully treated by surgical operation, although they were not long ago considered inoperable, Dr. Richard H. Meade, of Philadelphia, told the American College of Physicians.

Whereas ten years ago forty out of every hundred patients died after operation for removal of part of the lung in cases of lung tumor, today only about eighteen out of every hundred such patients are lost. Removal of the entire lung has been successfully accomplished twenty times since first performed in 1931.

Discussing the advances in surgery of the chest, Dr. Meade said that these technical advances had made possible the real eradication of inflammatory lesions of the lungs and bronchi and a radical attack on cancer of these structures.

Science News Letter, May 11, 1935

ANTHROPOLOGY

American Negroes Are Mixed Race; Not Africans

NEGROES in America are hardly entitled to call themselves "Africans"; they have too much Caucasian and Indian blood in them. This idea, long popularly held in a rather vague fashion, has received scientific support in studies on American Negro anatomy carried on by Dr. Robert J. Terry at Washington University in St. Louis. Speaking before the meeting of the American Association of Physical Anthropologists, he said:

"The type is unstable and in transition. It offers therefore opportunity for studies in race mixture. American laboratories of anatomy and physical anthropology can perform an important service by fostering research in the physical constitution of the type as it now presents itself."

Science News Letter, May 11, 1935

FIELDS

BIOLOGY

Freshwater Shrimp Eats Mosquito "Wigglers"

FRESHWATER shrimp would seem to be the most inoffensive creatures in the world, yet a certain fierceness has been discovered in them—and the trait appears to be beneficial to man.

G. Robert Lunz, Jr., of the Charleston Museum, reports (*Science*, May 3) that a number of freshwater shrimp which he has had in his aquarium for about a year have shown a lively appetite for the larvae, or "wigglers" of mosquitoes. They chase them through the water-plants, catch them with their pincers, and chew them up alive.

"This does not present proof that in its natural environment this species eats the larvae of the mosquito," Mr. Lunz adds, with proper scientific caution. "However, since it positively occurs in an aquarium, it seems probable that such is the case in the natural habitat of these shrimp. Such feeding habits make this species very valuable economically."

The freshwater shrimp used by Mr. Lunz in his feeding experiments belongs to the species known to zoologists as *Palaemonetes exilipes*.

Science News Letter, May 11, 1935

GENETICS

Dogs Show What Happens In Unbalanced Matings

DOGS illustrate some of the things that can happen to human beings, in cross-breedings of stocks already unbalanced in their heredity Dr. C. R. Stockard, of Cornell University Medical College, New York City, told the National Academy of Sciences. But what is true of dogs is true to a lesser degree of human beings.

Dr. Stockard, in his present breeding experiments, crossed the English bull with the heavy-bodied, wrinkle-hided basset hound. The recombinations of gland-controlled characters in the second-generation hybrids produced animals with heads and bodies that combined in all imaginable ways the characters of both parents, and also others that had very much exaggerated bull or basset characters, or even apparently quite new features.

The fantastic results, Dr. Stockard explained, were due to the effects of certain hereditary characters on the ductless glands, which in turn control the growth and proportions of bony skeleton and other parts.

Science News Letter, May 11, 1935

SEISMOLOGY

Armenian Earthquake May Be Due to Volcano

CONJECTURES that the destructive earthquake in the Mt. Ararat region in Armenia were due to volcanic activity receive support from the absence of any record of it on the tracings of seismographs in this country and other places remote from the disturbed area. Volcanic earthquakes, though frequently very destructive, are practically never "earth-shakers," that is, they do not send tremors through the solid crust of the earth for thousands of miles, as do the quakes caused by faults slips, or sudden movements along natural split-lines in the crustal rocks.

Although the great volcanic peak of Mt. Ararat has never erupted during all recorded history (and history is old in its neighborhood), volcanic action is not unknown in Armenia and adjacent regions. Dr. Karl Sapper, noted German volcanologist, states that during the Middle Ages, in 1441, there was an eruption of Nimrud volcano, on the western shore of Lake Van. Another volcano, Sipah Dagh, north of the lake, smokes all the time, it is stated and a third mountain, named variously Tanturek and Tanturlu, was in a fiery state during the middle of the last century.

Almost a century ago, in 1840, the Ararat tragedy of the past few days had a precursor, in a series of severe earthquakes releasing avalanches and mud floods.

Ararat is not the only "holy mountain" of Hebrew, Christian and Mohammedan tradition that is credited with being an extinct volcano. Mt. Sinai, where Moses received the Tables of the Law, is volcanic, and some biblical scholars are convinced that the awesome phenomena recorded in the nineteenth chapter of the Book of Exodus were really an eruption. It has also been suggested that the destruction of Sodom and Gomorrah were caused by a volcanic explosion.

Science News Letter, May 11, 1935

PHYSIOLOGY—PSYCHOLOGY

Inheritance, Not Glands, Determines Personality

PERSONALITY is not so much a matter of glands as of inheritance, Dr. Walter Freeman, of George Washington University, said at the meeting of the American College of Physicians.

The endocrine glands can bring out personality and enhance it by increasing the energy of the individual, but they cannot change the direction in which the energy will be expended, nor the type of personality an individual has. That is determined by genetic factors operating before he is born. In other words, you cannot make an extrovert out of an introvert by feeding him gland extracts. The effect of glands on personality is a matter of quantity, not quality.

Dr. Freeman's statements were based on studies of 1400 cases of disease of the endocrine glands. Harmonious functioning of the glands is necessary for stability of temperament Dr. Freeman pointed out. Irritability, or sensitivity of the nervous system, which would be reflected in the personality, may be caused by lack of balance between the endocrine glands, by an excess of thyroid hormone or a deficiency of parathyroid hormone, for example.

Science News Letter, May 11, 1935

BOTANY

Para Rubber Trees Grown From American-Grown Seed

RUBBER-growing possibilities in Florida are re-opened to discussion by a report from Dr. O. F. Cook, rubber specialist of the U. S. Department of Agriculture, (*Science*, May 3). Dr. Cook states that true Hevea or Para rubber trees have been grown in Florida from American-grown seed. This first generation of "native-bon" Heveas is more than a year old.

It was necessary to provide special conditions for the young trees Dr. Cook states, because the Hevea tree is specially adapted for growth in the still, moist air of the tropical jungle, and the thin leaves had to be protected against the strong trade winds of the Florida coast. The roots also had to be assured of an unfailing supply of moisture. But with these conditions met, the young Heveas throve well and did not seem to mind the occasional chill nights as much as did other tropical rubber plants from regions less near the equator.

Science News Letter, May 11, 1935

FALCONERS: MODERN STYLE

From left to right: John Craighead, Julian Griggs, Robert Stevenson, Frank Craighead. Other members of the hawk-training group are Morgan Berthrong and Larry Hufty.

From Page 303

ture birds can be fed on such hearty viands as raw beefsteak and liver, but younger ones must have tenderer meat, like pigeon. So the longer you wait the less you have to fuss with feeding and the less danger there is of your young birds dying on your hands.

Taming and training a hawk is based on the same universal appeal used on almost all animals and birds you want to make into friends: teach them to expect food from you, and associate feeding with the thing you want them to do. By gentleness and careful approach you induce the birds to accept meat from your hand; teach it to perch on your wrist or finger while it pulls off bits of beef. Then you hold the meat in your hand before the bird on its perch, and let it hop or fly a couple of feet to get its meal.

Gradually you increase the distance, but always with a leash to the bird's feet, until it will fly some yards, or even tens of yards, to the offered food. The larger the hawk the longer the distance it must be taught to fly to you before it can be trusted in the air without the leash.

You teach your hawk to come to the lure as well as to your hand. A lure is simply a padded weight—a block of wood, or a heavy horseshoe wrapped in cloth, or something of the kind—with the necessary piece of meat attached to make it interesting to the hawk. It is trailed along the ground, or whirled around the hawker's head, to attract the bird's attention when it is in the air. Once it has thoroughly learned that the lure, or your whistle, always means meat to eat, your falcon will always "stoop" to the lure—come dropping out of the sky like a rocket in reverse. One big hawk the Craighead lads once owned would "stoop" to the lure so fast that it knocked it a couple of feet when it struck—they named that one "Cyclone."

A novice hawk's first flight after game, the boys state, is always a critical affair. You should not let your bird loose for its first independent kill until it looks like a pretty sure thing, for a failure at the outset is likely to discourage a bird, whereas later on it will not be particularly disappointed if it fails to catch its prey.

When a hawk has made its capture, whether a bird in the air or a rabbit or other small animal on the ground, it "covers" it with outstretched wings, exactly in the attitude shown by the golden hawks in the royal headdresses of ancient Egyptian kings and queens. If the prey is a bird, and the hawk is being allowed to eat (thereby ending its desire for hunting any more that day), it will pluck off the feathers before it tastes the flesh, unless hurried or afraid of being disturbed. If you intend to fly your hawk again, you do not permit it to eat its fill, but take the prey out from under its talons, let it have a few bites of meat, and put it back on your fist.

These are the outline elements of hawking, as told by Frank and John Craighead. There is a lot more to learn, especially about what to do when a bird looks ill, and how to keep it housed, and what kind of a bathing arrangement it likes. But the would-be falconer will learn all these things in due order.

Protect Song Birds

The Craigheads are, of course, choicy in the prey they permit their hawks to pursue. Rabbits and smaller rodents on the ground, pigeons, sparrows and starlings in the air, are about the limit. They will not loose their hawks when there are small songbirds in sight; though as a matter of fact relatively few of these fall victims to hawks, even in the wild. Songbirds, most of them, are creatures of woods and brushland, and most hawks are hunters of the open sky. It is really an incautious cardinal or oriole that exposes itself to the attack of a wild hawk.

The Craighead twins have tried out all kinds of hawks, and have their opinions of the value of each. The big, heavy-bodied hawks, like the red-shouldered and red-tailed hawks, are too dull and slow, they say, to put up much of a show, though they are big enough to master a husky rabbit without trouble. Cooper's hawk and the sharp-shinned hawk they find excellent birds; but their favorite is the duck hawk, and its relative, the prairie falcon, is also a fine hunter.

Two small hawks, the pigeon hawk and the sparrow hawk, they also find interesting and worth training, though these are not big enough to do any serious hunting. They are named, as a matter of fact, for their size rather than for their choice of prey; the sparrow hawk is little larger than a sparrow, and the pigeon hawk is about the size of a pigeon. In spite of the diminutive stature, however, they really can capture their namesake-birds if given a chance.

Females are Fiercer

For hunting purposes, female hawks are usually chosen. This is partly because in most species they are a good third larger than the males, and partly because they are fiercer and more eager hunters. Some male hawks, however, are excellent birds. Ulysses, the male duck hawk, is a "honey" in the opinion of the boys. He is swift, a sure attacker, and very tame and good-natured. He has but one fault; once loose, he likes to wander for a good, long while before coming back home; hence his name.

The Craigheads have suggested a somewhat paradoxical use for hawks:

they think they can be valuable as aids in game-bird conservation. It works out this way: game birds like pheasants and bobwhite will take cover and not move a feather so long as a hawk is overhead. The idea is to have one of the big birds "wait on," as falconers say—circle slowly overhead, while the game refuge keeper searches the brush for them, perhaps with a well-trained dog. With the birds "frozen" in this way, he should be able to make the necessary game censuses and get a close-up view of his birds for health and general conditions, which would not be possible if they were not afraid to break cover.

Use of hawks against crows, which are sometimes destructive to game bird nests and eggs, is probably not so simple a problem, though hawks are used for driving out rooks in England. The trouble is, that a wild hawk knows a crow is no good to eat. If a tame hawk can be prevented from ever tasting crow, by taking his prey away from him promptly and giving him a pigeon already dead, as the rook-hunters do in England, it might help to rid a district of crows. For Corvie is a wise old bird, and will vacate if he finds the neighborhood getting too bad for crow health.

The Craigheads are indignant at the intransigeant attitude of many game commissioners and wardens, who insist on regarding all hawks and owls as "vermin," killing them indiscriminately. Most hawks, and practically all owls, feed largely or exclusively on rodents, and so should be regarded as beneficial birds, entitled to full legal protection and the encouragement of everybody who is a real friend of wildlife.

Science News Letter, May 11, 1935

MEDICINE

Cortin Promises to Conquer Wasting Disease of Children

CORTIN, the hormone produced by part of the adrenal glands and recently hailed as a life-saving remedy for usually fatal Addison's disease, may prove to be very useful in ameliorating the unhappy effects of a baffling disease of children, muscular dystrophy.

Work done on several cases of progressive muscular dystrophy, hypertrophic muscular dystrophy, and myasthenia gravis, in comparison with other abnormal conditions and normals, was reported by Dr. M. X. Sullivan of Georgetown University to the American Society of Biological Chemists.

A chemist himself, Dr. Sullivan became interested in the muscle disease when he found it was accompanied by certain changes in the body chemistry. In this disease a substance called creatine, which is normally changed in the body to creatinine during muscle activity, is excreted via the kidney as unchanged creatine, scientists found. Investigating further, Dr. Sullivan, aided by Dr. Walter C. Hess and P. Irreverre, found that relatively appreciable amounts of guanidine are excreted in this disease, generally in a combined form readily converted to free guanidine by oxidation with silver oxide or mercuric oxide.

Guanidine is a protoplasmic poison and prevents the passage of an impulse over nerves to muscles. The muscles remain inactive and gradually waste away. Glycine, long considered valuable in checking the progress of the dystrophies, did not eradicate the simple guanidine derivatives but did seem to check the progress of the disease more or less.

Case Described

In one case of a seven year old boy, treatment for several months with cortical extracts taken in pill form brought about changes towards normality. The wasting of the muscle which characterizes this disease was checked, the appetite improved, weight increased, and the excretion of material yielding guanidine ceased.

Dr. Sullivan described a new colorimetric test which he had developed for free guanidine not given by combined guanidines. Material yielding free guanidine he finds is excreted in muscular dystrophies, especially pseudo-hypertrophic muscular dystrophy, but not in a similar disease of adults called myasthenia gravis. Some possibility exists that the cortin treatment taken early may actually have curative value.

Science News Letter, May 11, 1935

ASTRONOMY

Moon "Rays" May be Mirrors of Volcanic Ash

EVER since the telescope was invented and first turned on the surface of the moon scientists have been puzzled over the cause of great bright "rays" which radiate, like petals on a daisy, from some of its craters. Thirty thousand craters have now been observed on the moon's surface and 30 of them show such "ray" characteristics. Much speculation has been advanced which interpreted the rays as giant valleys or hills that reflected the sunlight back to man on earth.

The committee on Lunar Geology of Carnegie Institution of Washington has just suggested a new explanation of these long bright rays, some of which can be traced for more than a third of the moon's circumference, or over 2,000 miles.

Dr. George W. Munro of Purdue University reports, "it is quite probable that the rays, which to us are such an important feature of the lunar face, would be quite undetectable to one on the moon itself."

The reason appears to be, Dr. Munro suggests, that the highly reflective bright streaks are not great valleys or mountains but rather striplike lunar "mirrors" composed of volcanic ash which covers the earth's satellite.

Each particle of this ash reflects sunlight. In general the ash specks have a random distribution which scatters light in all directions. If, however, the moon were struck a violent blow it is highly possible that vibration waves would be set up on the surface. While persisting for only a short interval of time, such vibrations could orient particles so that their reflecting powers would greatly increase in a given direction.

If one asks where the moon would receive a violent shock that could cause the vibrations scientists point to the already existing evidence of the havoc wrought by millions upon millions of meteor impacts on the moon.

The moon, Dr. Munro reports, (*Science,* April 26) has its history plainly written on its face. Its larger craters are easily classified as to age. (*Turn Page*)

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"It is notable," Dr. Munro says, "that those craters with 'rays' are all classified as 'young,' with sharply defined edges and little evidence of more recent disturbance. This is as we should expect, for whether we consider volcanic or meteor impact activity, every movement of materials covers existing landscape features including the rays, which, having little height, would be easily obscured and so observable only in connection with the later craters."

The present interpretation, therefore, adds one additional link in the now strong chain that many of the lunar craters are of meteoric origin.

Science News Letter, May 11, 1935

PHYSIOLOGY

Pituitary Gland Is Nature's Sculptor, Molding Human Face

THE PITUITARY gland at the base of the brain, master of all endocrine glands of the body, has another role. It is Nature's sculptor which models the head, face and features of man. The mechanism by which the pituitary plays this newly-discovered "sculptor" role was disclosed by Dr. Hector Mortimer, of McGill University, at the meeting of the American College of Physicians.

Finding how the gland acts to change facial features will aid the endeavors of physicians to diagnose and treat disorders of the gland. Dentists will also be aided in their own problems of facial and palatal growth.

Scientists have for years studied the question of the mode of growth in the human face in an endeavor to solve the question of those changes which make the Mongoloid features so different from either the Negroid or those of the white race, the Caucasoid.

Since the time of the great English anatomist, John Hunter, it has been known that facial bones—the foundation of the features—change through infancy to full adulthood by a process of modeling. It is as if a sculptor had, with his thumb, removed human clay from one part to smear it on another. Hunter showed that this occurred by the simultaneous processes of resorption in one area and deposit in another.

While Hunter's observation of this process of bone growth and development was true, it gave no indication of the mechanism by which it happened. Today confirmation has been given his observation and the mechanism explained in the light of modern knowledge of the pituitary gland.

It is the pituitary gland which, elaborating hormones that control growth in all its aspects, plays the dominant role in this mechanism. Removal of the pituitary in rats, Dr. Mortimer showed, stops entirely that differential part of growth which is called development—the process by which the small baby face of childhood becomes the large, well-grown, firm-jawed face of the adult man.

The essential process of resorption by which bone increases in size is made possible by the somatropic hormone from the pituitary, Dr. Mortimer said. This hormone lightly decalcifies the bony structure and expands its vascular bed. When the impulse to grow diminishes, consolidation takes place by a mechanism which is the reverse of that producing the expansion. In short, the flow of gain is followed by the ebb of consolidation.

Dr. Mortimer showed the process of expansion depends on the purified growth fraction of the anterior pituitary which today is labeled the somatropic hormone, and which is entirely free from any physiological effect on either thyroid, adrenal, or sex glands.

But the process of consolidation is less certain. It may occur, Dr. Mortimer indicated, through the intermediary action of the parathyroid glands in the neck, possibly as a result of stimulation of these glands by a parathyrotropic hormone also formed in the anterior pituitary. This latter hormone has not yet been identified but there is presumptive evidence for its existence which receives support from such scientists as Houssay of Buenos Aires and others, Dr. Mortimer said.

By the four types of characteristic cranial change which he demonstrated as occurring in over ninety per cent. of the pituitary cases in the University Clinic of the Royal Victoria Hospital, Montreal, Dr. Mortimer offered a new datum for the use of physicians treating glandular disorders and those specializing in the treatment of children.

Science News Letter, May 11, 1935

ARCHAEOLOGY

Germans Probe Old City Named in Book of Genesis

ERECH, named in the Biblical book of Genesis as one of the first cities built in the world by King Nimrod, mighty hunter, dates back to between 3000 and 4000 B.C., German archaeologists have discovered.

The seventh German expedition to Erech, or Uruk or Warka, as it is variously known, has been excavating since November at the Biblical city, and reports a successful season of discoveries. No less than 18 layers of ruins lie piled at the site near the Euphrates, in southern Mesopotamia.

The expedition has succeeded in tracing the complete course of the wall which encircled the ancient city five and one-half miles round. At least one-third of the huge area thus enclosed was taken up with "holy places."

The excavators are concentrating on layers dating from about 3000 to 4000 B.C. Tunnels driven under a temple tower of about 2300 B.C., revealed temple votive offerings and other relics belonging to cities of earlier periods.

Elsewhere in the city, a temple of about 321 to 64 B.C., the time of the Seleucid Empire, was found. Beneath this lay ruins of an older temple of great size, measuring about 350 feet by 262, and with walls almost 20 feet thick.

Science News Letter, May 11, 1935

CHEMISTRY

Isolation of Pure Vitamin A Near

A NEW world's chemical record for concentrating vitamin A, food constituent vital for normal growth, resistance to disease and general "pep" producer, was reported to the American Chemical Society.

Dr. Harry N. Holmes and his co-workers at Oberlin University described new developments in the advance toward the long sought goal of complete isolation of the vitamin in 100 per cent. purity.

While admitting the goal is not yet attained they reported the production of a fluid 14,000 times as concentrated as standard cod liver oil. This is a 40 per cent. gain over the previous world's record made in 1931 by Prof. P. Karrer of the University of Zurich, Switzerland. The Swiss concentrate was only 10,000 times as potent as the standard oil.

Science News Letter, May 11, 1935

DEMOGRAPHY

NATURE RAMBLINGS
by Frank Thone

No New Thing

SUBSISTENCE homesteads, over which we are making so much to-do nowadays, are really no new thing under the sun. We had government-aided settlement of surplus population on the land generations ago; only the conditions were so different on the surface that we usually fail to see the underlying similarity.

Our earliest subsistence homesteaders were the very ones whom our somewhat academic present day resisters of innovation are wont to laud as the very type and model of "rugged individualism." We commonly deprive them of the benefit of Latin adjective, and call them simply homesteaders, or sometimes pioneers.

Let there be no shout that the original homesteaders were not feeders from the hand of government generosity. They most decidedly were. They got a lot more than the present subsistence-homestead population will get, colonized on their peasant-sized plots of land. True, subsistence homesteaders of today are helped to the land, but they will have to pay for it. The original homesteader got outright, absolute, fee-simple title to his land, either scot-free or so cheap that it might as well have been.

It wasn't a carefully shaved-off two- or ten-acre plot, either. The old song that "Uncle Sam is rich enough to give us all a farm," was borne out in fact: for a hundred years Uncle Santa Claus did deal out whole farms. All the homesteaders had to do was go out and subsist on them.

The subsistence problem was different then, of course. Instead of looking for a part-time job that would pay him enough cash to buy factory-made furniture, clothing and kitchenware, the original homesteader (plus his family) had to make them on the spot, except for rifle, powder, and a few iron tools and pots.

But materials for such home manufacture were available; and to counterbalance some of the scarcities of household gear, food was usually abundant and cheap. The fresh-broken virgin soil yielded many years of harvest before fertilizers needed even to be thought of, and until pioneer days were well over the woods and prairies swarmed with game. No subsistence homesteader of today will be able to fire both barrels of a shotgun into the air and bring down a bushel of passenger pigeons, without even troubling to take aim, as his oldtime namesake frequently could.

The beneficent Government took most effective means to clear title to the land it was so lavishly giving away, by sending out such active agents as Anthony Wayne, Andrew Jackson and "Old Rough-and-Ready" Taylor to negotiate with the Indians. The present administration is much tenderer: so far, at least, it hasn't shot a single mortgage-foreclosing banker, or herded even one landholding insurance company off onto a semi-arid reservation. It is actually paying them now, as it expects one day itself to be paid.

Science News Letter, May 11, 1935

POPULATION

Estimates 25,500,000 Persons Over 65 in 1980

THERE will be 25,500,000 people over 65 years of age in 1980. This is the estimate of those who would be old enough to be entitled to old age pensions under proposed legislation, made by Drs. Louis I. Dublin and Alfred J. Lotka, of the Metropolitan Life Insurance Company who spoke before the Conference on Population Studies in Relation to Social Planning.

This estimate set pencils to figuring. If every person over 65 in 1980 were to receive $15 per month as the Federal share of an old-age pension, the total bill would amount to $4,490,000,000. This is much higher than the estimate of the President's Committee on Economic Security who figured that the maximum would be reached in 1980 at $1,294,300,000. The Committee's estimate was based on the assumption that there would be only about 17,000,000 persons over 65 in 1980.

The use of a succession of life tables allowing for the lengthening of the life span and the increase of the proportion of older people in the population was urged by Drs. Dublin and Lotka in their report.

The birthrate in the United States has declined to a point where it is too low to allow the present population to replace itself in the next generation, they told the meeting. In the year 1920, the rate of natural increase was 5.4 per thousand. That is, 1000 persons would be replaced by 1005.4. Since then the increase has dwindled past the zero point until in 1933 there was actually a decrease of 3 per thousand, or almost as much on the negative side as it was on the positive side ten years previously.

Science News Letter, May 11, 1935

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ARCHAEOLOGY

King Mycerinus, Like Humpty, Was Hard to Put Together

KIND-HEARTED Pharaoh Mycerinus, credited with inventing the dole system 5,000 years ago for Egypt, left a hard enough task to museum workers in Boston, Mass.—putting his statue together again.

Restoring a fine alabaster portrait of the famous monarch has at last been achieved satisfactorily, reports the Boston Museum of Fine Arts, (*Bulletin*, April) which has been perplexed by the pieces for 25 years. While France debated whether to restore arms to the Venus of Milo, Boston wondered what to do with Mycerinus, who is in a far more incomplete state.

Scattered fragments of the statue were among the important finds made by Prof. George Reisner, director of the Harvard University-Boston Museum of Fine Arts Expedition to Egypt in 1907. Exploring the funerary temple of Mycerinus, near his pyramid at Giza, the expedition found evidences of rough usage of the place by robbers long ago. Knees of the King's great alabaster statue lay in a temple corridor. Fragments of torso and shoulder were down a hole in a storeroom. A plunderer's trench yielded the King's head in alabaster and more body pieces.

For several years, the expedition clung to hope of finding further portions of the great statue. When no more appeared, the Museum displayed the lower part of the King's statue, showing his hands resting on his knees. On a shelf above, Mycerinus' head looked out on visitors, calmly and regally ignoring the gap where his torso should have been.

The Great Pyramid of Egypt was built in 20 years, but putting a shattered Pharaoh of the Pyramid Age together again may take longer, the Mycerinus statue demonstrates.

The alabaster Pharaoh has gone through no less than four experimental stages, while curators worried. Those in charge were extremely reluctant to venture filling in missing parts of the statue. It was hardly the scholarly thing to do, they feared. On the other hand, visitors were distracted and certainly received a false impression from seeing Pharaoh Mycerinus with his head on a tray and his broad shoulders totally missing.

The Museum tried modeling a plain and inconspicuous body form in cement merely as a physical support for the one broad shoulder and mighty chest of the Pharaoh and to join head and hips together. Then they ventured to model a more realistic plaster body in the style of the ancient sculptor of the work.

Now, lappets of the wig and outline of belt have been boldly added, and the missing arms and feet have been supplied, according to models of the same period. With this solution, the Museum curators really believe that they have got the Pharaoh of the Third Pyramid off their shoulders at last. They have preserved scholarly carefulness by painting the restored parts buff and even outlining them with a fine white line. The public can see the Pharaoh in all his complete powerful majesty.

Mycerinus owes his fame as the kind-hearted Pharaoh of the Pyramid Age to stories told by historian Herodotus in the fifth century B. C. If Herodotus was correctly informed on his ancient history, Mycerinus invented the dole system of helping those who were hard pressed. The dole money he took out of the royal treasury.

His father, Cheops, on the other hand, had used unemployment relief work, putting laborers in large shifts at work on his Great Pyramid at times when the Nile flooded the land, and agricultural work had to be suspended.

Science News Letter, May 11, 1935

A machine has been devised to peel potatoes by scuffing off their skins.

ASSEMBLING THE KING

The view above shows the site where the head was found. Below, the head rests proudly on a shelf above his knees, calmly ignoring the gap where his torso should have been. The final step in the assembly of his parts is shown on the facing page.

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PUT TOGETHER AGAIN

MEDICINE

Early Treatment Would Eradicate Bright's Disease

BRIGHT'S disease, third leading cause of death today, can be completely eradicated if it is treated in its early acute stages, before it becomes chronic, Dr. Francis D. Murphy of Milwaukee, told the American College of Physicians meeting, basing his opinion on a ten-year study of 136 cases.

Bright's disease, or nephritis, as physicians term it, has become a serious problem because colds and sore throats are not usually considered a factor in causing it. Too often the disease, following such infection of nose and throat passes unnoticed until considerable damage has been done to the kidneys.

"When nephritis becomes chronic, there is little that can be done to forestall the downward trend of the disease," Dr. Murphy said.

Therefore he urged physicians to look for the disease in its early stages when treatment will be successful in curing it. Bright's disease causes more deaths than any other maladies except heart disease and cancer. Its high death-rate can be reduced only by attacking it in its early, acute stages, Dr. Murphy declared.

Science News Letter, May 11, 1935

PHYSIOLOGY

Two Hormones, Twins of Those Known, Found in Pituitary

TWO NEW hormones from the pituitary gland, each a twin to already known pituitary hormones, were reported by Dr. Leo Loeb, of Washington University, St. Louis, in an address to the American College of Physicians following his presentation with the John Phillips Memorial Medal of the College.

The new pituitary hormones act on thyroid and female sex glands, respectively. Scientists had previously recognized a species difference in the extracts from the pituitary that influence thyroid and sex glands. An extract from the pituitary gland of a cow has a stimulating effect on the cow's sex glands but just the opposite effect on the guinea pig's glands, for example.

Investigations conducted by Dr. Loeb during the past two months and reported in Philadelphia for the first time show that this different effect is due to the production by the pituitary of two different hormones with antagonistic effects on female sex glands. In the pituitary glands of cattle, the ovary-stimulating hormone predominates while in pituitary glands of other species of animals the antagonistic hormone predominates.

The presence of these two hormones, where only one was formerly thought to exist, may have a relation to the anti-hormone effect discovered by Dr. J. B. Collip and associates of McGill University, Dr. Loeb said. Dr. Collip and associates have found substances called anti-hormones in the blood of men and other animals that check the effect of the pituitary hormones.

Dr. Loeb's other recent discovery of two thyroid-stimulating hormones from the pituitary may throw further light on the cause of Graves' disease or exophthalmic goiter, the disease characterized by pop-eyes, rapid pulse and other disturbances. Dr. Loeb and other scientists have been able to produce all the Graves' disease symptoms in healthy animals by giving them doses of thyroid-stimulating pituitary hormone, which suggests that disorder of the pituitary may be a cause of this kind of goiter. Dr. Loeb is now studying the pituitary glands of persons who died of Graves' disease. He hopes to find which of the two thyroid-stimulating pituitary hormones predominate in these glands, and thus may be responsible for the development of Graves' disease.

Science News Letter, May 11, 1935

A person who eats an egg a day probably gets enough Vitamin D for his needs, even if he gets none in other foods, says a Government vitamin authority.

RADIO

Tuesday, May 14, 3:30 p. m., E.S.T.

THE SARGASSO SEA, by Dr. Anselm Keefe, Rector, St. Norbert's College.

Tuesday, May 21, 3:30 p. m., E.S.T.

THE MOSAIC OF NATURE, by Dr. George J. Peirce, Professor of Botany, Stanford University.

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Science News Letter, May 11, 1935

Chemistry

THE CHEMICAL FORMULARY, VOLUME 2—Ed. by H. Bennett—*Van Nostrand*, 570 p., $6. Beginning with "Adhesive for Aluminum" and ending with 'Spontaneous Combustion Reducer," there are thousands of recipes or formulae, many with patent numbers. An addition to, not a revision of, the earlier volume 1.

Science News Letter, May 11, 1935

Anatomy—Physiology

GUIDE TO THE HALL OF MAN—C. E. Cummings—*Buffalo Museum of Science*, 16 p., 15c. An illustrated guide to the new Cabana Hall of Man in the Buffalo Museum.

Science News Letter, May 11, 1935

Botany

BOTANY, PRINCIPLES AND PROBLEMS—Edmund W. Sinnott—*McGraw-Hill*. 526 p., $3.50. A third edition of a botany textbook which has been very well received in American colleges and universities.

Science News Letter, May 11, 1935

General Science

ANNUAL REPORT OF THE DIRECTOR TO THE BOARD OF TRUSTEES FOR THE YEAR 1934—*Field Museum of Natural History*, 280 p., $1.

Science News Letter, May 11, 1935

Botany

THE LICHEN FLORA OF THE UNITED STATES — Bruce Fink — *University of Michigan Press*, 426 p., 47 plates, $4. The late Prof. Fink probably acquired a better knowledge of the lichens, those "flowers of the moon," than any of his contemporary botanists. The fruits of his many years of taxonomic research on this too-little studied group have been gathered into a single volume of good descriptions, well keyed, and published posthumously by a former associate, Mrs. Volney Hedrick Jones. The book is sure of an eager welcome by botanists everywhere.

Science News Letter, May 11, 1935

General Science

SCIENCE BY OBSERVATION AND EXPERIMENT—Hanor A. Webb and Robert O. Beauchamp — *Appleton-Century*, 697 p., $1.72. A general science text aimed at the junior high school student. It works on the now properly popular scheme of tying in the student's everyday experiences with basic scientific principles, and it also constantly keeps before the student's consciousness the scientific essentials of observation and experiment.

Science News Letter, May 11, 1935

Economics

AGRICULTURE'S INTEREST IN AMERICA'S WORLD TRADE—Division of Information, U. S. Dept. of Agriculture—*Government Print. Off.*, 22 p., 5c. A condensed exposition of the farmer's stake in foreign trade, in catechetical form.

Science News Letter, May 11, 1935

Natural History

BUTTERFLIES AND MOTHS OF AMERICA—Lillian D. Fazzini—95 p.; WILD FLOWERS OF AMERICA—Jane Harvey—95 p.; THE RED BOOK OF BIRDS OF AMERICA—Frank G. Ashbrook—95 p.; TREES YOU WANT TO KNOW—Donald C. Peattie—95 p.; *Whitman Publishing Co.*; price correction: 10c *plus postage.*

Science News Letter, May 11, 1935

Economics

CORPORATE PROFITS AS SHOWN BY AUDIT REPORTS — W. A. Paton — *National Bureau of Economic Research*, 151 p., $1.25. "The average rate of earnings on total net assets as reported for all the corporations in the sample, for the entire period 1927-29, was 8.4 per cent.; the average profit rate on stockholders' equity was 9.2 per cent."

Science News Letter, May 11, 1935

Ethnology—Archaeology

FROM THE PYRAMIDS TO PAUL—By 21 authors; edited by Lewis Gaston Leary—*Thomas Nelson and Sons*, 306 p., $3. In honor of the seventieth birthday of Prof. George L. Robinson, leading scholars in Biblical archaeology, theology, and related subjects have prepared this collection of essays. Prof. W. F. Albright offers his theory regarding the mysterious Horites of Palestine. Prof. George S. Duncan presents translations of the oldest immortality writings, from royal pyramids of Egypt. The evolution of books is traced by Prof. J. F. Lyons. And so on through 20 chapters, with an introductory chapter on Prof. Robinson's own career by Dr. Gilbert Wilson.

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Botany

WEEDS—W. C. Muenscher—*Macmillan*, 577 p., $6. Much has been written, sometimes quite dramatically, about the insect enemies and fungus diseases that rob men of his crops. Less has been said about weeds, which are at least as important in the role of undesired guests at man's table. This book does a very satisfactory job from both botanical and agronomic viewpoints, telling in considerable detail, and with good line illustrations, what the principal weeds are and where they came from; telling also the most promising means for combatting them.

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Botany

THE PLANT KINGDOM—William H. Brown—*Ginn and Co.*, 869 p., $3.50. A textbook for college use, suitable for a full-year course, developed out of an earlier but briefer successful book by the same author.

Science News Letter, May 11, 1935

Scientific Biography

AMERICAN SCIENTISTS — C. J. Hylander—*Macmillan*, 186 p., $2. Brief biographical sketches of 23 typical American men of science, all the way from Franklin and Bartram to Morgan and Urey.

Science News Letter, May 11, 1935

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